

Performance Work Statement

1. Title: Remotely operated vehicle (ROV) video monitoring of near shore and deep water habitats off Puerto Rico

2. Work Assignment Manager (WAM):

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3. Period of Performance: Issuance date to March 28, 2013. Fieldwork to begin on or about February 15 through February 28, 2013, but subject to change based on the final NOAA Fleet Schedule.

4. Background: The Environmental Protection Agency (EPA) is conducting a monitoring project to characterize near shore and deepwater hard bottom seafloor habitats (<300 m) in the vicinity of ocean dredged material disposal sites and transit routes to the sites off the north and west coast of Puerto Rico. This work is in conformance with the Marine Protection, Research, and Sanctuaries Act (MPRSA) and the Site Management and Monitoring Plans of the ocean disposal sites. Over the past several years, EPA has documented the presence of hard bottom areas with significant vertical relief in shallow waters outside the harbors and in deeper areas near the disposal sites using side scan SONAR. Many of these areas are located in water depths that are significantly greater than depths typically associated with coral, however NOAA-NMFS has also proposed listing several species of deepwater corals as threatened species under ESA. In addition, areas of high relief located in shallower areas along expected transit routes used by loaded dump scows may also be coral reef. Because scow malfunctions or weather conditions can cause discharges of dredged material outside designated boundaries of the sites, it is imperative to determine whether these hard bottom areas are in fact populated by coral or are just exposed rock faces and to document the relative health of these habitats.

A detailed cruise plan and final cruise dates will be provided to the contractor. The objective of the ROV services will be to collect data for EPA scientists to identify whether hard bottom habitats identified with side scan are comprised of live corals that warrant special protective measures and to document the condition of any corals at the selected study sites.

5. Purpose: Previous surveys identified various potential reef areas outside San Juan, Arecibo and Mayaguez harbors using the side scan SONAR. Unfortunately, SONAR technology cannot differentiate between live hard bottom and rock and thus videographic/photographic confirmation is required to determine whether they are coral reef and thus must be afforded additional protections against degradation due to EPA regulated dredged material disposal activities.

A Remotely Operated Vehicle (ROV) will be used to collect digital underwater color video and photographic

data within three shallow to deep water study sites (Figure 1) using the NOAA ship Nancy Foster.

6. Objectives: The Government requires a contractor to supply a ROV with associated equipment and staff with optical imaging equipment capable of operating in water depths of 5 to 300 meters so as to allow EPA scientists to sufficiently characterize the nature of these habitats. The contractor will provide the following deliverables within 14 days of completion of the research cruise: digital video data (DVD format), digital still photos (JPG Format), voice recorded comments, ROV geopositioning with time stamps, and originals of all analog notes taken during operations.

The 2013 NOAA ship schedule indicates that this project begins on February 14, 2013 and ends on February 25, 2013. February 14th and 25th are in-port non-operational days, thus 10 operational days are scheduled for this project (three of the days are set aside for weather days in the event of adverse conditions, which will be used at Chief Scientists discretion if weather conditions are favorable).

7. Description of Tasks:

Please note the schedule of deliverables listed below has been indicated by a due date or an estimated length of time. If during the period of performance of this work assignment any deliverable dates need to be changed, the WAM will amend the PWS through formal contracting procedures.

- a. **Seafloor Video Acquisition** The Contractor will provide a suitable ROV and personnel of sufficient experience and qualifications to lead the acquisition of video data for the Period of Performance of the EPA cruise. The Contractor should be experienced in managing mid- to shallow water (5m – 300 m water depth) digital video and still camera acquisitions for the purpose of seafloor characterization. The remotely operated vehicle to be used by the contractor shall be capable of operating in water depths ranging from 5 to 300 m water depth and maintaining a height above the seafloor between 0.5 and 2 meters. The ROV shall have the capability to record both video and underwater still photos for a minimum of two continuous hours while underwater and be able to work 12-hour days with less than 4 hours down time, a low-light color video camera (with at least 460+lines of resolution, auto-iris, 12:1 zoom and auto/manual focus), a static downward-pointing high-resolution camera for taking digital still photos (with at least 3.2 megapixels) at least 30 seconds apart, dual 250-W tungsten-halogen lights or equivalent for operating in low-light or nighttime conditions, a strobe flash for taking still pictures (with power at least 76 watts/second) a dual-laser scaling device (separation on the order of 10 cm), a tilt platform for maneuvering the camera angle forward and downward between 0 and 90 degrees to horizontal, digital recording capability (DVD for video and JPG for still photos), and a capability to geoposition the ROV to 10 m CEP 95 every 1 sec at 300 m depth. The ROV propulsion and control system must be capable of turning and forward/backward vehicle speeds of a minimum of 2 knots.
- b. **Navigation/ROV Tracking** The ROV must also provide an integrated navigation system (consisting of Hypack Max 2012 software on a Dell 1.6 GHz computer, ORE Offshore 4410C Trackpoint II Underwater Acoustic Tracking System with an ORE Offshore 4377A transponder with depth telemetry, Northstar 951XD differential GPS, and Azimuth 1000 digital compass or equivalent). This system must provide real time tracking of the ROV and ship to the ROV operator and the support vessel's bridge for navigation. ROV personnel are to install a DGPS antenna and a hydrophone on the vessel and survey their positions with respect to a reference point at the center of the vessel. The hydrophone mounting alignment is to be checked at the

dock using submerged transponders. DGPS antenna and hydrophone offsets, as well as ship dimensions, are to be entered into the underwater acoustic tracking system. The system is to interrogate the transponder on the ROV. Using the three-element hydrophone, the system is to determine slant range, bearing, and depth. The real-time navigation screen is to accurately display the ship (to scale) with proper position and heading, and the position of the ROV. Navigation software is to also export ROV data in real time as a NMEA data string which contains ROV position only. Ship and ROV positions, in addition to the ROV depth, heading and altimeter reading, are to be logged and processed for each dive and provided to the scientist in an Excel file. Geo-referenced .tif files obtained with side scan sonar must be able to be entered into the navigation software as background files to display target sites and features of interest to aid in ROV and support vessel navigation.

ORE Offshore 4410C Trackpoint II acoustic tracking system specifications are:

Horizontal Pinger Position Accuracy: $\pm 0.75\%$ RMS of Slant Range (depression angle $> 45^\circ$ from horizontal)

Horizontal Transponder Position Accuracy: Absolute Accuracy: $\pm 0.5\%$ RMS of Slant Range

Repeatability Accuracy: $\pm 0.5\%$ RMS of Slant Range

Slant Range Accuracy: ± 1 meter (assuming correct speed of sound input)

Slant Range Resolution 0.3 meters

Receive Signal Frequency 22-30 kHz in 500 Hz increments

Receive Signal Pulse Duration 1.33 ms minimum

Receive Signal/Noise Ratio >40 dB at wideband filter

Transmitter Output Frequency 4.5-30 kHz in 500 Hz increments

Transmitter Output Pulse Width 1 to 15 ms in 0.1 ms increments

Transmitter Output Repetition Rate 1 to 20 seconds

Transmitter Output Power 100 or 500 watts into 300 Ω , user selectable

ORE Offshore 4377A transponder specifications are:

Receive Frequency 19 kHz

Receive Pulse Width 5 ms minimum

Transmit Frequency for Navigation 24 kHz

Transmit Frequency for Depth Telemetry 23 kHz

Transponder Turn Around Time 15 ms

Transponder Lock-Out Time 1.9 seconds (**Minimum interrogation rate is 2 sec.)**

Transponder Depth Rating 1000 meters

Personnel: The Contractor will provide personnel with experience operating a ROV onboard large oceanographic research vessels and must be capable of deploying and recovering the ROV in up to sea state level 4. The Contractor will manage the collection of video and photograph data near Puerto Rico onboard the NOAA ship Nancy Foster. Personnel must be provided to allow 12 hours of ROV operation/day

The Contractor will be responsible for briefing the EPA Chief Scientist on daily progress, progress to date, and assist the Chief Scientist in coordinating planning for subsequent days. The Chief Scientist will serve as COR and be responsible for briefing the CO.

Deliverables: The Contractor shall provide the following deliverables:

TASK	DELIVERABLES	DUE DATE TO EPA
Task 1: Photographic and Video Imagery	The contractor shall provide a minimum 1 terabyte drive (minimum 70 hrs of video) with all footage obtained during the survey and any electronic notes	Due at conclusion of survey
Task 1: Navigation Information	Contractor shall maintain and provide ship position logs (e.g., xls formats) that can be cross referenced with time stamps to determine ROV position based on locational offsets from ship	Due at conclusion of survey

8. Work Assignment Requirements:

TRAVEL:

The Government estimates that the Contractor personnel will be required to travel to meet the research vessel in San Juan, Puerto Rico. The travel costs will be included in the costs proposal. If logistically feasible, arrangements can be made to mobilize equipment on the Nancy Foster in Charleston preceding the transit to Puerto Rico to occur on or about February 7, 2013. Equipment can be offloaded from the Nancy Foster in Charleston, SC once the ship returns to the east coast in April, 2013.

SPECIAL CONDITIONS:

REFERENCE SYSTEMS

The Contractor will provide all positions referenced to Universal, Transverse Mercator Projection (UTM) Zone 20. Ellipsoidal heights will be computed in North American Datum of 1983 (NAD83) reference frame using Geodetic Reference System 1980 (GRS80) ellipsoid.

NOAA SHIP SPECIFICATIONS

Specifications for the NOAA ship Nancy Foster can be found at <http://www.moc.noaa.gov/nf/index.html>. The ship length (LOA) is 57 meters, breadth 12.1 m, and maximum draft 3.0 m. Bunk space can be provided for up to 4 ROV operators and technicians. The ship has an A-frame with a Maximum Load of 22,000 lbs, J-frame with 5,000 lbs lifting capacity, and Main-deck Crane with 10,000 lbs lifting capacity at maximum reach. The ship has a Dynamic Positioning system (DP).

NOTICE REGARDING GUIDANCE PROVIDED UNDER THIS WORK ASSIGNMENT:

Guidance is strictly limited to technical and analytical support. The contractor shall not engage in activities of an inherently governmental nature such as the following:

- (1) Formulation of Agency policy
- (2) Selection of Agency priorities
- (3) Development of Agency regulations

Figure 1 –Project Areas for 2013

